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# BUREAU OF LAND MANAGEMENT WATER RESOURCES PROGRAM FOR NEVADA



UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT  
NEVADA STATE OFFICE  
AUGUST, 1978

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STATE DIRECTOR, NEVADA

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BUREAU OF LAND MANAGEMENT  
WATER RESOURCES PROGRAM FOR NEVADA

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## I. Purpose

### A. Purpose of this Document

Water Resources, basic to all renewable resources, are fundamental to all life cycles. Nonrenewable resource production is closely tied to availability and wise use of water resources. Therefore, it is essential all Bureau of Land Management (BLM) decisions and actions consider the need for protection and beneficial use of water resources.

The purposes for developing a water resources program are fourfold:

1. To facilitate compliance with executive orders, Federal laws, and regulations concerning water resources.
2. To provide guidance to line managers for analysis of water resources considerations in the land management program.
3. To establish organizational functional responsibilities to guide water resources specialists in fulfilling professional responsibilities.
4. To provide a sound basis for addressing water resources in fiscal program planning.

The water resources program is one component of the soil, water, and air activity (4340) in the Bureau as depicted in Illustration 1, Page 2.

### B. Purpose of the Water Resources Program

The BLM manages natural resources on 48 million acres in the State of Nevada, the largest amount of land under a single jurisdiction within the State. The water resources program must be oriented toward land management problems and opportunities, and toward environmental concerns through conservation and enhancement practices.

The Nevada BLM water resources program consists of nine primary tasks which follow:

1. Water management applies hydrologic theories and techniques to the water resources of small and intermediate drainage basins. The disciplines of climatology, meteorology, biology, geology, physics, chemistry, statistics, mathematics, and soil science are used in applying hydrology to land use, program and project planning. An important task includes active participation in interdisciplinary environmental studies, Unit Resource Analyses (URA), Management Framework Plans (MFP), activity plans, and on site investigations.



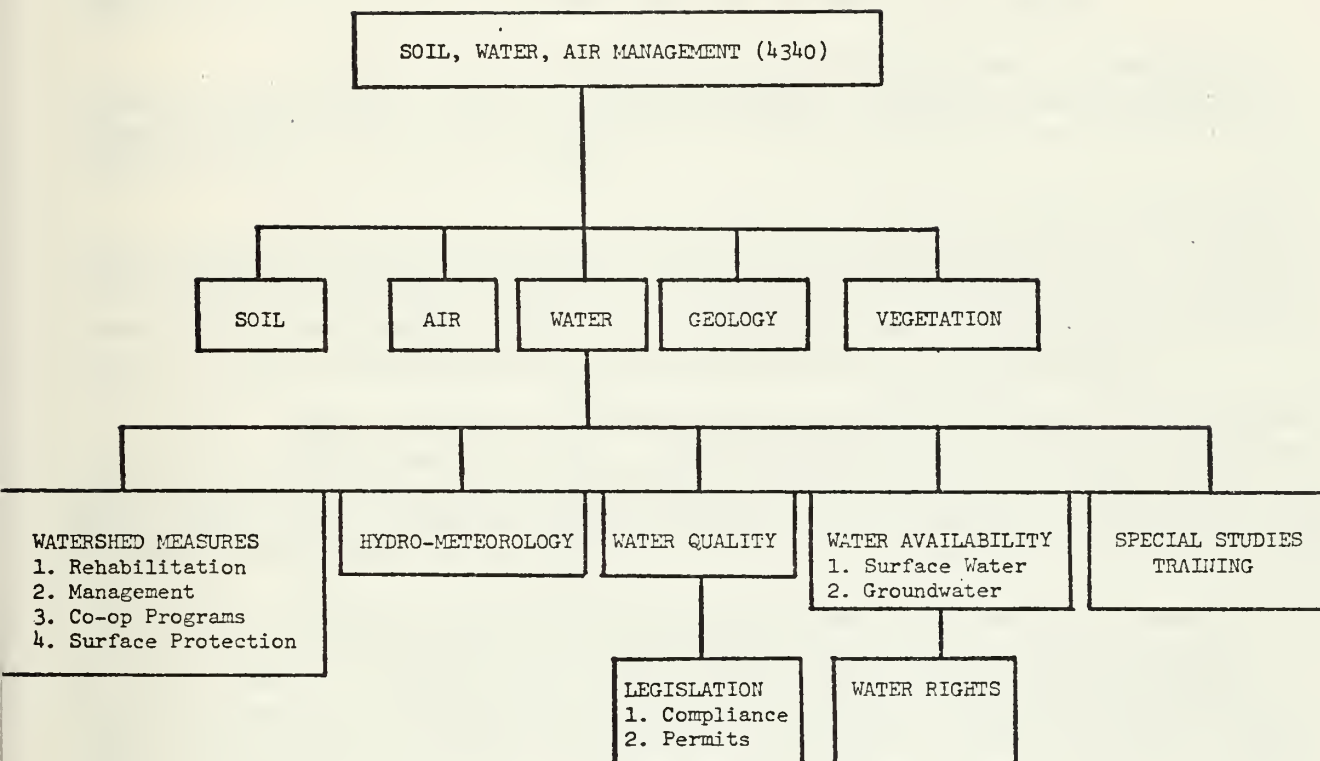


Illustration 1: Soil, Water, Air Activity



2. Water resources investigations are necessary to evaluate on site hydrologic processes. These include inventories of water quality and quantity from which to evaluate impacts on management activities. Data interpretations characterize the existing environment and predict probable impacts.

3. An important component of the water management program is the identification of accelerated erosion problem areas, the causes, and management designation and/or treatment programs to solve the problem.

4. Disaster surveys describe the kinds and amount of damage sustained by watersheds because of flood, drought, fire and other disasters. Identification of lost watershed value, their restoration, and future preventative practices should be made.

5. Water quality management involves formulating Best Land Management Practices (B.M.P.) consistent with water quality objectives. This task is achieved through the Bureau Planning System in coordination with State water quality management planning and implementation. Development of B.M.P. requires basic data provided by a water quality monitoring program.

6. Small watershed studies (Nevada Watershed Studies), established in the early 1960s, are continuing. The data is needed to evaluate watershed component interrelationships and predict the results of land treatments. These efforts will complement water resources investigations and bridge the gap between research and administration.

7. Internal coordination in the use and application of water resources data is accomplished by on-the-ground instruction and workshops. Technical data is transformed, as far as possible, into an understandable form for the user. Planners and decision makers need to know hazards and risks associated with land-use options. They must be aware of policy, legislation, executive orders, and regulations concerning water resources as they apply to BLM programs.

8. Formal training of water management specialists must be provided to maintain technical proficiency, to update procedures and equipment, and to assure continued quality performance.

9. Coordination with other BLM functions; other local, State, and Federal agencies; and research and industry representatives is an important function within the water resources program. A unified approach is needed to solve mutual problems, to identify opportunities for enhancement of soil and water resources, and to avoid duplication of effort.



## II. Objectives of Water Resources Program

Managers must understand the potential impacts their decisions will have upon the quantity and quality of surface and subsurface waters. They also need to understand the relationship of water to other dependent resource values, such as vegetation, forage, wildlife habitat, wood products, recreation and aesthetics.

A. The goals of the water resources program are to provide basic water resources information and management services, to implement sound multiple resource planning and management, and to maintain or enhance quality and productivity of water resources. Primary objectives are:

1. Provide water resources information and hydrologic services to management in program, project, and land-use planning so that local, State, and Federal water resources requirements are met or exceeded.
2. Ensure the preservation and protection of water supply needs for all BLM public land resource uses, and to provide as much high quality water as possible for these and other uses.
3. Collect and interpret water resources data in a manner responsive to BLM program and administrative needs, including environmental assessments.
4. Provide hydrologic skills for watershed inventories, plans, and management services, interpreting water resources information to form a scientific base for water management decisions.
5. Ensure compliance with Federal and State laws, Executive Orders and regulations concerning protection of the quality and quantity of water resources for intended uses (EO 11514 and EO 5003).
6. Increase staff specialists' and resource managers' understanding of the application of water resources information.

## III. Authorities

- A. Public Law 91-190, The National Environmental Policy Act.
- B. Public Law 94-579, Federal Land Policy and Management Act of 1976.
- C. Public Law 92-500, The Federal Water Pollution Control Act.
- D. Public Law 93-523, Safe Drinking Water Act with the 1977 Amendments (P.L. 95-190).
- E. Public Law 95-217, Clean Water Act of 1977.
- F. Executive Order 11752, concerning pollution control and abatement.
- G. Executive Order 11514, concerning monitoring of water quality impacts.
- H. Executive Order 5003, concerning protection of water resources for intended uses.



#### IV. Definitions

Definitions needed to understand this document follow.

A. Hydrology is the science that treats the waters of the Earth, their occurrence, circulation, distribution, chemical and physical properties, and their interrelationships with the environment, including living things (Federal Council for Science and Technology, 1962).

There are three aspects of applying the science of hydrology: (1) the measurement, recording, and publication of basic data, (2) analysis of the data to develop and expand functional theories, and (3) the application of these data and theories to solve practical problems. Hydrology draws upon related fields and natural sciences for much of its theory and data. Applied hydrology, as it relates to the Bureau of Land Management, mainly concerns the water resources of small drainage basins.

B. Watershed Management is essentially the management of the natural resources of a drainage basin for the production and protection of water resources, including the control of erosion and floods, and the protection of aesthetic values associated with water (Hewlett and Nutter, 1969).

It is concerned with relationships between the management of vegetation and soil, and the quality, quantity, and timing of watersheds' water production, as they affect on site and downstream use. This involves problem identification and solving, prescribing kinds of land use, nonuse, or use modification (hydrographic modification, water pollution control, stream or channel management, etc.) to meet management needs and to achieve optimum benefits.

C. Water Resources are waters which can be utilized or extracted from the ground or surface sources and which constitute or result in an economic and social product.

#### V. Policy

BLM policy requires all water management and protection activities on public lands be planned and administered so as to attain the widest range of beneficial uses without environmental degradation, risk to public safety and health, or loss of public values. Impacts upon water resources must be evaluated for any proposed management activity because water is basic to other renewable resources.

Therefore, it is Nevada Bureau of Land Management policy to:

A. Assure sustained yield and multiple use are basic objectives for land-use planning and management of BLM-administered lands in relationship to the quality and uses of water resources (P.L. 94-579).



B. Protect, restore, maintain and/or enhance water quality on all BLM-administered lands so that its utility for dependent ecosystems is maintained equal to or above legal water quality criteria. Water quality limits are defined by applicable laws and regulations.

C. Water quality monitoring of land-use activities shall be performed to evaluate, protect, maintain, or enhance quality of waters on, or passing through, BLM-administered lands (P.L. 94-579).

D. Assure water resources data needed for sound planning documents and environmental statement efforts are collected and maintained. The Nevada Watershed Studies provide on-going data collection, adding long-term aspects to data collection from representative small and intermediate-sized watersheds. This data, along with data from other agencies and research groups, shall be incorporated into the Bureau Planning System and reflected in activity plans and environmental statements. Further, all data or studies are to be thoroughly documented so subsequent efforts can benefit from the findings.

E. Comply fully with the intent and objectives of the National Environmental Policy Act, other related laws, executive orders, and regulations, specifically the Federal Land Policy and Management Act of 1976 (Public Law 94-579).

## VI. Responsibilities

Any successful program requires clearly defined responsibilities at each organizational level. The water resources program responsibilities follow.

### A. State Director

The State Director, with technical expertise from:

#### 1. Chief, Division of Resources, and his staff will:

- Provide Districts and activity managers with up-to-date interpretations of Bureau and Departmental policy and Federal and State legislation concerning water resources.

- Coordinate the water resources program within the overall soil, water, and air program (4340) and with other BLM activities, in terms of funding and program priorities.

- Review all District water resources programs for Annual Work Plan input and quality control.



- Prepare program emphasis statement and AWP program directives for BLM in Nevada to be implemented each fiscal year.

- Ensure statewide compliance with BLM policy, executive orders, and legislative requirements pertaining to water resources.

- Formulate water rights policy and coordinate with the State of Nevada and the Regional Solicitor in water rights matters.

- Establish a functional evaluation for the water resources program to assure a unified statewide approach.

2. Chief, Division of Resources will:

- Coordinate water resources investigations and studies between State and Federal agencies, and between Districts and neighboring States.

- Ensure technical adequacy of planning documents and implementation programs.

- Provide technical guidelines and training opportunities for field specialists.

- Coordinate storage and retrieval of BLM-generated water resources data.

- Advise Districts on selection of specialist personnel for program expansion or for filling vacancies.

- Provide centralized support in cooperative programs, inter-agency agreements, and computer services.

- Ensure that acquisition and interpretation of water resources data follow accepted technical standards.

3. Chief, Division of Technical Services will:

- Provide technical advice on water rights surveying techniques and ensure compliance with established engineering standards.

- Provide flood hazard and flood plain evaluation for planning.

- Provide technical guidelines and engineering review for all operational and/or construction phases of the water resources program, i.e., wells, water structures, channel stabilization, and erosion control.

B. District Manager

The District Manager, with the assistance of his Chief of Resources and District water management specialist or hydrologist will:

1. Establish a District water resources program which protects the water resources of the public lands and is compatible with the statewide program but specific to the needs of the District.



2. Review and modify the program on a continuing basis with respect to new policy, legislation, AWP directives, and State Office review.

## VII. Program Composition

The Nevada water resources program is composed of two parts, in harmony with the Bureau Watershed Program Thrusts, approved March 16, 1977. The first part is to support all other BLM activities (planning and environmental coordination, range, wildlife, lands and realty, recreation, forestry, engineering, minerals, fire and protection). Assistance will be provided in management, development and resource use in fulfillment of the activity goals.

The second part of the program is operational. Its purpose is to maintain a basic data collection program, utilizing information to support programs and projects intended for enhancement and protection of water resources.

The support services and operational program are shown in Illustration 2. A discussion follows.

### A. Support Service to All Activities

The basic role of the Water Resources Program in Nevada is to provide a consulting service to the land manager. The program is based on the gathering and interpretation of scientific information to enable management to make sound land management decisions. Water resources support services involve the application of hydrologic information to present or proposed resource development and management programs. Support services include providing protection measures for control of soil erosion, flood and debris control, channel stability, sediment yield, water quantity and quality, recreation use requirements, instream flow requirements, and timing of surface and subsurface flows. Support includes participation on interdisciplinary planning teams.

Written documentation of support input should be incorporated in an activity plan, or in assistance or staff reports.

#### 1. Guidelines for Hydrology Staff Reports

Basic hydrologic inputs must be provided for all resource development and management programs and land use planning to meet BLM directives and policy establishing quality and quantity goals. This input may consist of a staff report developed by the water management specialist or hydrologist for presentation to management. It should contain the following elements, when applicable:

- Onsite investigation characterizing water resources.



NEVADA  
WATER RESOURCES  
PROGRAM COMPOSITION

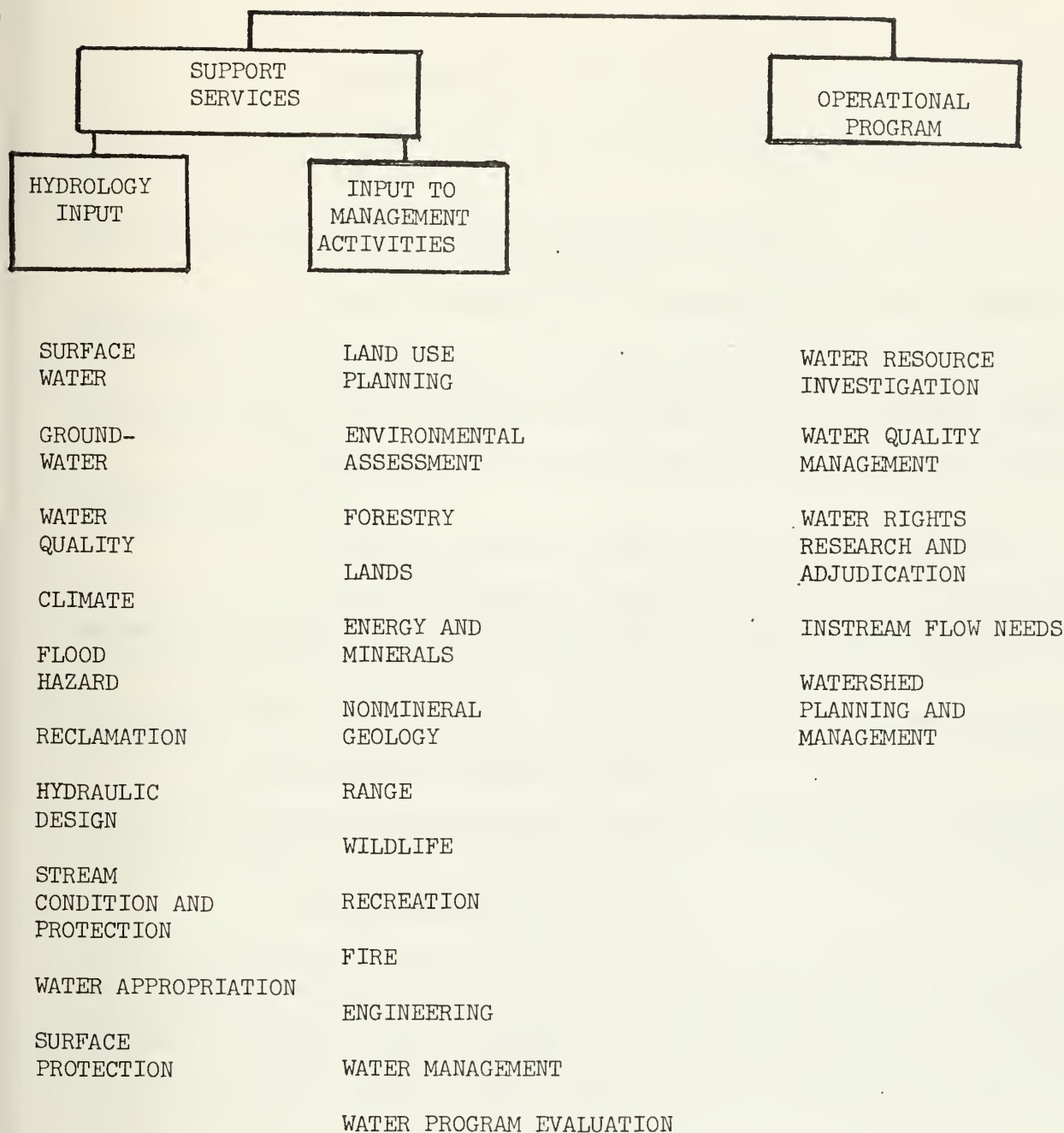


Illustration 2: Nevada Water Resources Program Composition



- A description of the problem.
- An evaluation of water quality tolerance levels based on the resource situations.
- An identification and quantification of impacts on water resources values resulting from a proposed activity.
- Identification of site potential in relation to desired objectives.
- Identification of feasible mitigating measures and their anticipated effectiveness of maintaining quality within acceptable tolerances.
- Discussion of a proposed action's predicted risk with selected mitigating measures.
- Analysis of water resources data or investigations.
- Recommendations for: additional data needs; needed funds and manpower; onsite work needed to accomplish mitigating measures; guidance measures needed to avoid potential problems; and input into planning system.

This report should become part of a permanent record for future reference.

## 2. Water Resources Activity Inputs

The following section describes BLM activities, their objectives, and water resources' inputs to each activity.

### - Water Management

The water management program provides soil and water resources data to all BLM activities on public lands. A service program provides all activities with soil and water resources data and analyses which assist in development, management, and use of their resources and programs. The operational program designs, develops, and implements on-the-ground projects and programs for the protection, rehabilitation, and enhancement of soil and water resources.

The water management program's long-term objectives are to stabilize watersheds, to restrict further deterioration of soils, and to improve watershed conditions to meet specific resource needs such as greater water quantity, improved water quality, sediment reduction, and reduction of flood damage.



Short-term objectives involve application of land treatments such as brush control, grass seeding, and fencing to control soil erosion. Restoring soil productivity improves man's environment by enhancing other resource use values such as livestock forage, fish and wildlife habitat, outdoor recreational opportunity, woodland products production, and aesthetic quality.

Water resources' inputs to the activity are to conduct:

- (1) On site investigations, interpretations and analysis to determine land capability, site potentials, hazards and risks, potential and magnitude of impacts and adverse effects. Recommend feasible mitigating measures, and identification of water quality standards and monitoring needs in the development of water management plans.

- (2) On site evaluations and treatment recommendations for improvement or maintenance of water resources values relating to fire rehabilitation.

- (3) On site investigations and evaluations for effects on water pollution (nonpoint source) involved in vegetative manipulations such as herbicide spraying.

#### - Lands

The lands activity's primary purpose is to administer development and use occupancy of the public lands through the land laws. The objectives are to conduct land-use planning to analyze the need for different uses of the public lands, and to coordinate land acquisition through exchange and purchase. Other objectives are to maintain a land title record system, and to coordinate the granting of rights-of-way. Classifying lands and making land-use adjustments support BLM and other agency programs, and identify lands that must be reserved to meet Federal, State, and local government needs.

Water resources' inputs to the lands activity are:

- (1) Identification of flood plains and areas susceptible to high water tables and flash flows.

- (2) Determination of adequate water supply--surface and sub-surface--for agricultural uses in classifying land as suitable or unsuitable for land disposal.

- (3) Determination of use restrictions in relation to water quantity and quality impacts.



(4) Review of data provided by permittee and recommendation of mitigating measures to correct damage of past use by special use permittees.

(5) Compliance with State of Nevada water quality standards and U.S. Army Corps of Engineers' construction permits.

- Minerals

The minerals activity objective is to provide for the production of minerals from the public lands. It consists of promoting orderly and timely minerals resource development; obtaining fair market value for the mineral resource secured; and mitigating surface disturbance and air quality degradation associated with mineral development. Many water resources concerns in the Western States are being addressed by the Energy Minerals Rehabilitation Inventory and Analysis (EMRIA) program.

Water resources' inputs to the minerals activity are:

- (1) Determination of impacts of proposed mineral development activities and recommendations for mitigating measures with respect to surface and subsurface flow patterns, stream channel geometry, change in aquifer characteristics and surface and subsurface water quality.
- (2) Location of potential water sources for use in developing mining and mineral processing (such as oil and gas development).
- (3) Determination of water requirements for reclamation.
- (4) Review of reclamation recommendations for resource protection and management in the development of locatable, salable, and leasable minerals.
- (5) Recommendations for lease stipulations covering operational quality control, mining and mineral processing, waste disposal and monitoring.
- (6) Ensure that consumptive water needs of threatened or endangered species shall not be affected by minerals development.

- Geology

The geological activity objectives include:

- (1) Identification and study of geologic hazards resulting from mineral production.
  - a. Exposure of unstable materials (bentonitic clays).
  - b. Disruption of ground water aquifers.
  - c. Creation of shafts, high walls around mines.



- (2) Disruption of fragile soils through removal of vegetation.
- (3) Identification of earthquake fault zones and landslide-prone areas.
- (4) Geologic and paleontologic inventory.
- (5) Water well site investigations.

The water resources inputs to the geological activity are associated with minerals production (see minerals activity).

- Range

The goals of the range program are to manage the uses on the rangeland so as to achieve identified multiple-use objectives; to provide livestock forage to help stabilize the economy of the livestock industry, individual users, and dependent communities; and to provide forage for wild horses, burros, and wildlife.

Range activities include inventory, allocation, management and use evaluation of vegetative resources on public lands, as used by domestic livestock, wildlife, wild horses and burros. This involves supervising grazing use, maintaining livestock facilities, and protecting the range from pests, diseases, and weed infestations.

Water resources' inputs to the range activity are:

- (1) Conduct on site water resources investigations and provide analyses to determine land capability, hazards and risks, impacts, and recommendations of feasible mitigating measures and estimated effectiveness of those measures, as needed in Allotment Management Plans.
- (2) Determination of the potential for, and quality of, surface and subsurface waters to be used in development of Allotment Management Plans and grazing systems.
- (3) Collection and analysis of climatological data as it pertains to site productivity.
- (4) Identification of quality standards and monitoring needs.
- (5) Determination of on site and off site impacts of livestock use and vegetation manipulation treatments on water yield, timing, runoff peaks, quality, and erosion.
- (6) Determination of water resources impacts attributable to grazing, as opposed to the natural, geologic processes of the area.
- (7) Location and inventory of flood plains and areas susceptible to flooding.



### - Wildlife

The purpose of the wildlife activity is to protect, manage, and to provide wildlife habitats of sufficient quantity and quality to support an optimum diversity of species and population levels. Habitat management techniques assure high quality wildlife and protect threatened or endangered species. A primary objective is to be consistent with multiple use management.

Water resources' inputs to the wildlife activity are:

(1) Conduct inventories; provide water data interpretations and analyses to assist in determining land capability and sustained carrying capacity and treatments to protect water resources values, as needed in Habitat Management Plans.

(2) Determination of the potential for providing high quality surface or subsurface water to meet habitat requirements, including mitigating measures if site disturbances are involved.

(3) Determination of chemical, physical and biological water quality for terrestrial and aquatic flora and fauna.

(4) Quantification of instream flow requirements for terrestrial and aquatic flora and fauna.

### - Forestry

The main objective of Nevada's woodland management program is to maintain optimum woodland cover to prevent erosion, thus enhancing watershed, wildlife habitat, and recreation values. Another objective is to meet public demands for firewood, Christmas trees, fence posts, and pinyon nuts. The program seeks to protect the bristlecone pine tree stands found on public lands in eastern Nevada for purposes of scientific study and aesthetics.

Water resources' inputs to the forestry activity are:

(1) Conduct onsite investigations, interpretations, and analyses to help determine land capability, hazards and risks, potential and magnitude of impacts, recommendations of feasible mitigating measures in woodland management plans.

(2) Identification of quality standards and monitoring needs.



(3) Determination of the effect of woodland products harvesting on quality, timing, and volume of runoff and influence on sediment yields.

(4) Determination of effects on downstream water quality caused from slash treatment, i.e., burning, scarification, piling or scattering.

(5) Make recommendations for water control structures, re-vegetation, and other treatment practices on non-harvest or harvest areas.

- Recreation

The objectives of the recreation activity are to provide and protect the quantity, quality, and use of recreational opportunities of the public lands; to develop recreational use guidelines; to designate and develop areas of regional and national importance; and to inventory and protect environmental, aesthetic, and cultural values.

Water resources' inputs to the recreation activity are:

(1) Identify land use/management activities on recreational waters (both body contact and potable).

(2) Monitor water quality for recreational use (both onsite and downstream).

(3) Recommend or assist in developing criteria for recreational water quality management.

(4) Identify water resources opportunities for recreational use (both body contact and potable), and analyze flood hazard potential and risk factors to recreationists.

(5) Provide water resources inventories, analyses, and interpretations to determine site potential.

(6) Identify hazards and risks in suitability studies for wilderness area classification to protect critical areas.

(7) Provide hydrologic analyses and/or data for recreation wilderness portions of environmental statements.

(8) Provide historical hydrologic data to assist in analyses of depositional differences for archaeological purposes.



### - Engineering

The engineering branch within the Division of Technical Services in the State Office designs facilities, supervises construction, and compiles flood plain data from U.S. Geological Survey and U.S. Army Corps of Engineers and conducts the maintenance for the Nevada Watershed Studies (a hydro-meteorology program).

Water resources' inputs to the engineering activity are:

(1) Quantification of hydrologic data, analyses, and application criteria required for the construction and maintenance of roads, reservoirs, recreation and water facilities, and buildings.

(2) Provide technical and procedural input to drinking water quality monitoring at recreation sites and other administrative sites.

(3) Identification of flood plains and areas susceptible to flooding.

(4) Coordination on needed watershed measures.

### - Fire Management and Emergency Rehabilitation

The fire management activity within the Divisions of Technical Services and Resources includes the following: fire protection, presuppression, suppression, and fire use for resource management. Burned areas are rehabilitated when necessary to prevent further site deterioration and to restore or enhance pre-existing cover.

Water resources' inputs to the activity are:

(1) Acquisition and interpretation of climatic data, such as precipitation, wind, humidity, and temperature, to assist in fire forecasting, control, and prescribed burning.

(2) Quantification of hydrologic data, analyses, and application criteria essential to rehabilitation measures.

### B. Activity Operations

The functions of the activity operations phase of the water resources program are to determine the available quantities and existing qualities of surface and ground water, to protect and enhance these waters, and to minimize adverse impacts upon the resource which may result from BLM and other activities. Sound management decisions are made possible using these data and analyses.



To accomplish these functions the Nevada water resources program must include the following operational activities: conduct channel stability inventories; develop watershed stabilization, reclamation, and improvement programs; inventory water quality and its relationship to land management activities; inventory available water quantity and determine current State of Nevada water allocations.

#### 1. Water Resources Investigations - Nevada Watershed Studies

One of the most significant sources of baseline water resources data is the Nevada Watershed Studies. This is a project-oriented year-round study that was initiated and has continued since the early 1960s. The study encompasses 12 representative watersheds (see map, Illustration 3), small to intermediate in size, that have been instrumented in various ways so as to produce several types of data. Instrumentation (Illustration 4) includes A-35 Stevens precipitation and stream flow recorders, crest stage gages, rain cans, and soil moisture blocks.

##### - Study Procedures

- (1) Determine precipitation cycles, trends, and drought periods by use of rain cans and automatic recorders.
- (2) Develop hydrologic balance models.
- (3) Using instrumented watersheds with existing precipitation data as representative sites.

##### - Objectives

- (1) Produce annual precipitation curves showing monthly precipitation data, long-term averages, and standard deviations.
- (2) Identify storm frequencies, durations, and intensities.
- (3) Determine developmental capacities and limitations of soils and vegetation, based upon available precipitation.
- (4) Determine flood hazards and feasibility of detention dams.
- (5) Evaluate erosion potential by deriving sediment yield values.
- (6) Evaluate fire hazards.
- (7) Provide hydrologic guidelines for resource development programs and to support land management decisions for Best Management Practices.

The above objectives may be accomplished using data analyzed from the 12 instrumented watersheds. Data and analyses can be extrapolated to similar, non-instrumented watersheds in the State and are to be included in an annual report to each District.



# NEVADA WATERSHED STUDIES AREA LOCATION MAP

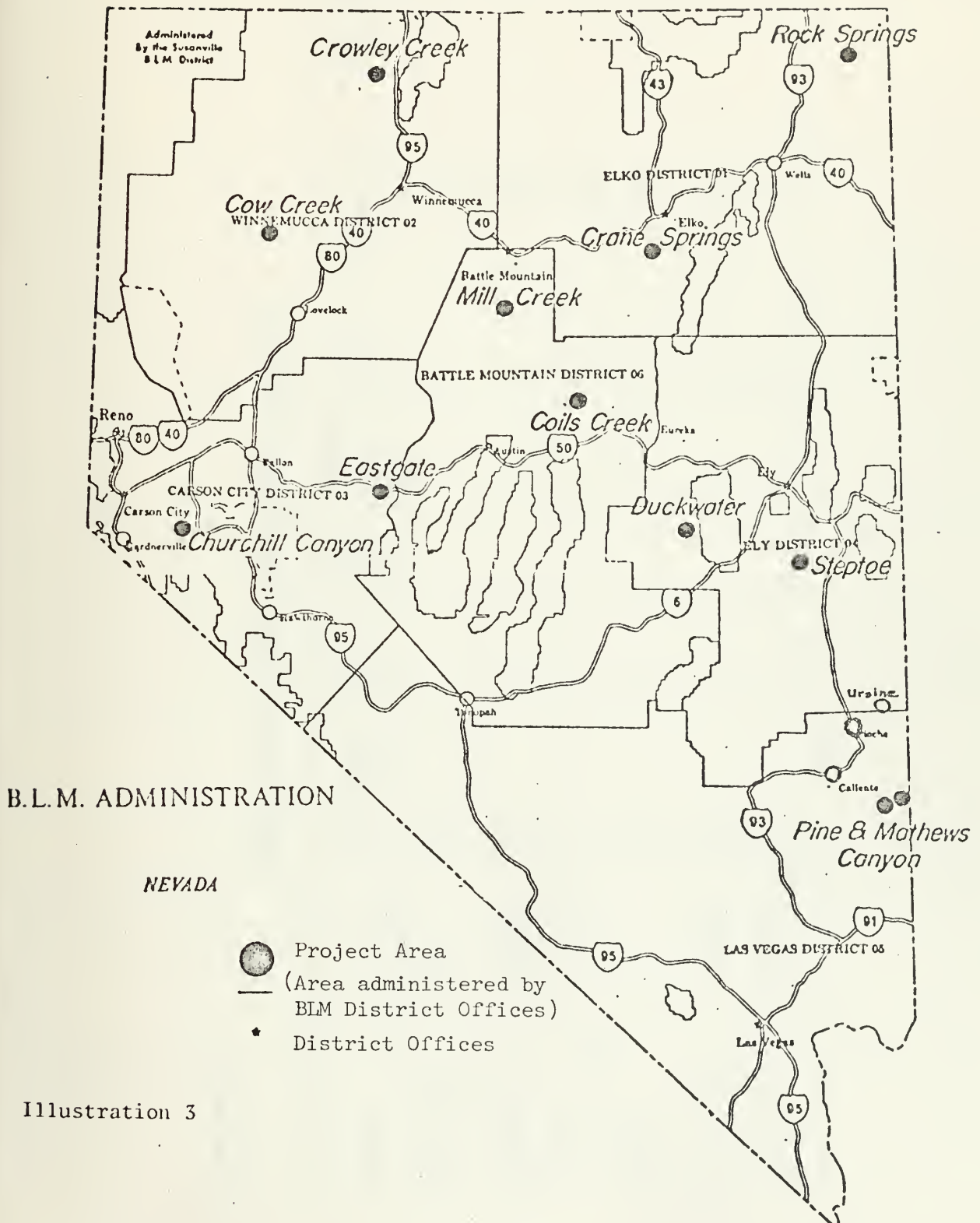


Illustration 3



Illustration 4

Instrumentation, Nevada Watershed Studies (as of 1977)

| Watershed        | District    | Data Collection Started | Recording Stream Gage |      | Crest Stage |      | Precipitation Gage |              | Drainage Area<br>Sq. Mile | Average Area Per<br>Precip. Gage |          |
|------------------|-------------|-------------------------|-----------------------|------|-------------|------|--------------------|--------------|---------------------------|----------------------------------|----------|
|                  |             |                         | No.                   | Gage | No.         | Gage | Tipping<br>Bucket  | Cans*<br>No. |                           | Sq. Mile                         | Sq. Mile |
| Rock Springs     | Elko        | 6/63                    | 1                     |      | 4           |      | 3                  | 20           | 77                        | 3.3                              |          |
| Crane Springs    | Elko        | 7/64                    | 1                     |      | 1           |      | 3                  | 11           | 30                        | 2.1                              |          |
| Crowley Creek    | Winnemucca  | 7/62                    | 1                     |      | 4           |      | 3                  | 17           | 56                        | 2.8                              |          |
| Cow Creek        | Winnemucca  | 10/64                   | 1                     |      | 3           |      | 3                  | 17           | 115                       | 5.7                              |          |
| Eastgate         | Carson City | 2/63                    | 1                     |      | 5           |      | 4                  | 22           | 213                       | 7.9                              |          |
| Churchill Canyon | Carson City | 9/63                    | 1                     |      | 3           |      | 3                  | 16           | 73                        | 3.8                              |          |
| Duckwater        | Ely         | 1/63                    | 2                     |      | 6           |      | 4                  | 24           | 96                        | 3.5                              |          |
| Steptoe          | Ely         | 11/63                   | 1                     |      | 2           |      | 4                  | 13           | 45                        | 2.8                              |          |
| Pine Canyon      | Las Vegas   | 8/62                    | 1                     |      | 3           |      | 2                  | 9            | 32                        | 2.9                              |          |
| Mathews Canyon   | Las Vegas   | 8/62                    | 1                     |      | 4           |      | 2                  | 12           | 36                        | 2.6                              |          |
| Coils Creek      | Battle Mtn. | 7/63                    | 1                     |      | 4           |      | 3                  | 18           | 50                        | 2.4                              |          |
| Mill Creek       | Battle Mtn. | 6/64                    | 1                     |      | 2           |      | 3                  | 12           | 23                        | 1.5                              |          |

\*Note: Number of rain cans subject to change.



Nevada Watershed Studies information is correlated, as applicable, with long-term air temperature, precipitation, and wind movement data from selected National Weather Service stations.

## 2. Data Sources and Coordination

The BLM will continue to use the U.S. Geological Survey (USGS) as a primary source of surface and subsurface hydrologic data, as USGS is responsible for coordinating all Federal agencies' water activities (OMB Circular A-67). The Environmental Protection Agency, USGS, and State agencies will continue to be major sources of water quality data. The BLM's role in Nevada is in the maintenance and data analyses of the Nevada Watershed Studies. The Bureau will continue the BLM water quality monitoring program, sampling all BLM waters in the State at selected sampling sites, until the program's projected completion in fiscal year 1985. The water at each sample site is to be sampled three times: during spring runoff, in summer during maximum bacteriological activity, and during fall in the low water flow period. The BLM will identify additional data needs and develop additional collection studies, as required.

### - Utilization of Data Storage Banks

The water resources program will interface with the Data Management and Remote Sensing Programs because S.O. watershed staff will be involved with data collection, storage, and retrieval.

Computer resource data storage and retrieval is being developed under the Bureau "Strategic Plan". As of this writing, no decision has been made as to whether the Bureau will have its own water resources data storage and retrieval or whether BLM will have access to other agencies' data banks (i.e., WATSTOR-USGS or STORET-EPA). If the Bureau develops its own data storage and retrieval system, it will likely be compatible with WATSTOR or STORET.

#### (1) WATSTOR (USGS)

The WATSTOR data bank of the U.S. Geological Survey (USGS) is available for use by the BLM through the USGS Water Resources Division in Carson City, Nevada. WATSTOR contains comprehensive surface water, groundwater, and water quality files which are set up on various software systems. The WATSTOR water quality file has a computer link to the STORET data bank of the Environmental Protection Agency (EPA).

#### (2) STORET (EPA)

The STORET data bank of the EPA contains extensive water quality files. To retrieve needed information for BLM use in Nevada, contact:

The Environmental Protection Agency  
Region IX  
Water Quality Division  
San Francisco, California



A STORET computer terminal is located in Carson City at the State of Nevada, Department of Conservation and Natural Resources, Division of Environmental Protection. Computer printouts must be batched through the mail to this terminal location.

(3) University of Nevada, Desert Research Institute

a. WADS - Water Resources Data Storage and Retrieval System (partially available through WATSTOR)

This data bank contains all historical water quality analyses on surface and groundwaters which have been published in Nevada, all results from State laboratories, and University of Nevada chemical analyses.

b. LITH - Lithologic Data Storage and Retrieval System

This data bank contains well logs filed with the State Engineer's Office.

c. Water Rights Storage and Retrieval System

This data bank is not fully functional but can receive water rights applications input and can potentially provide BLM with a status of water rights on Federal lands and the extent of appropriations in terms of available water.

d. Geothermal Energy Data Storage and Retrieval System

This data bank contains input from the western states on the chemistry of geothermal waters. This system is no longer receiving data input, but information already stored is retrievable.

(4) BLM Nevada State Office Terminals

The Nevada State Office (NSO) has two 30 characters-per-second terminals. As of this writing, NSO has established computer accounts with the U.S. Forest Service computer in Fort Collins, Colorado, and the Bureau of Reclamation computer in Denver, Colorado.

3. Water Resource Management and the Bureau Planning System

The water resources program will provide input into the Bureau Planning System with an ongoing inventory and water resources data bank that can be used by all other activities in planning their water resources use requirements.

This continuing inventory supplies the data for Steps 2 and 3 of the Unit Resource Analysis (URA). All activities, including water resources, use this data base to identify technically feasible alternatives for development in Step 4 URA. The information is then combined with legislative, policy, social, and economic factors in a Step 4 URA evaluation to determine which alternatives or combinations should become program management recommendations -Step 1 of the



Management Framework Plan (MFP). After the data base is applied to environmental concerns in constructing the ecological profile, these factors become inputs to management recommendations and decisions (Steps 1 through 3, MFP) as shown in BLM Manual 1605 to 1608.

The data base should become more reliable as monitoring and analyses produces additional information on effects resulting from interactions between water resources and other BLM activities.

#### 4. Water Quality Coordination and Management

Conducting and recording the results of water resources investigations within the planning system (and data banks) provide the Bureau with the information necessary for managing water quality on Nevada BLM lands. This program component must go beyond acquisition of baseline data. National legislation sets the framework for BLM duties in water quality management.

Public Law 92-500 (The Federal Water Pollution Control Act) establishes goals for attaining water of a quality suitable for fish, shellfish, wildlife, and recreation by 1983, and eliminating pollutant discharge into navigable U.S. waters by 1985. Section 313 and Executive Order 11752 require Federal agencies to comply with local, State, interstate, and Federal requirements concerning pollution control and abatement. Section 208 requires Federal agency cooperation with States in developing water pollution control plans for point and nonpoint pollution sources. Section 404 requires a permit be obtained from the U.S. Army Corps of Engineers for dredging operations, or placing fill materials in navigable U.S. waters. The Federal Court decision of *Natural Resources Defense Council v. U.S. Army Corps of Engineers* has broadened the definition of navigable waters to include any stream with an average flow greater than five cubic feet per second, or any water body with more than five surface acres. Executive Order 11514 requires Federal agencies to monitor their own activities for water quality impacts.

Water quality problems and concerns are not limited to surface waters. Groundwater chemical composition and pollutants are significant to land use planning. Potential pollution from deepwell solid and liquid waste disposal and from geothermal steam, and impacts to recharge and discharge zones caused by aquifer depletion are important concerns.

Under the Safe Drinking Water Act of 1974, the Bureau is responsible for ensuring the quality of all waters developed for public drinking supplies. This responsibility applies to community watersheds and to any and all water supplies which are regularly used for culinary water. The Division of Resources will have the lead technical role under this Act for policy matters and technical coordination and direction. The Division of Technical Services will continue to be responsible for the operational and engineering aspects of water developments.



The water resources program must include participation with local, State, and Federal agencies in formulating rules, regulations, and policy in water quality management planning. Such participation includes:

- Serving in an advisory capacity in PL 92-500, Section 208 planning efforts, ensuring that Bureau planning and policy are coordinated with the State water quality management plans and Best Management Practices.

- Assuming the lead role in implementation of Section 208 plans on BLM-managed lands.

- Working with the U.S. Army Corps of Engineers in development of PL 92-500, Section 404 general permits where they pertain to BLM activities and lands.

- Taking measures to ensure BLM management practices conform to the national water quality goals of 1983 and 1985. This may involve instituting restoration/rehabilitation measures in the near future in order to achieve acceptable improvement in water quality by the target dates.

- Providing assistance to resource activity managers with regard to BLM compliance with water quality procedures.

- Providing input to review of permit applications by other parties where their activities may affect water quality on BLM-administered lands.

## 5. Water Uses and Rights

The BLM has jurisdiction over all non-navigable waters in the State of Nevada existing on BLM-administered public lands. The Regional Solicitor has determined that, although the BLM has jurisdiction, the State of Nevada has authority granted by Congress to appropriate these waters to private users, based upon their ability to show beneficial use.

To protect BLM rights to make use of the waters existing on public lands, the BLM has been advised by the Regional Solicitor to file under protest for these water rights with the State of Nevada. The water resources program must ensure that water is available to satisfy the consumptive and non-consumptive water requirements of dependent resources and uses on public lands.

The Division of Resources has responsibility for participation in water rights adjudication and filing policy and guidelines. The Division of Technical Services has the responsibility for accomplishment of the land surveys necessary to identify the locations of waters being filed on.



## 6. Instream Flow Needs

To maintain water quality and to adequately support water-dependent resource values (terrestrial and aquatic flora and fauna) and uses, certain minimal flows are required. Furthermore, serious reduction of surface water flows can cause unacceptable concentrations of pollutants and the loss of aquatic habitat. The water resources program must identify minimal instream flow and conservation pool requirements. It provides for those requirements through proper land management and through preservation of the right to use waters on public lands for these purposes.

Responsibilities for instream flow quantification are shared by the following programs: water resources, wildlife and fisheries habitat management, recreation, range, and fire management within BLM. Close coordination exists between Nevada Department of Fish and Game, the State of Nevada Division of Environmental Protection and BLM.

## 7. Watershed Restoration, Maintenance, and Improvement

Water yield improvement opportunities in the form of increased water yields, altered timing of runoff, low flow augmentation, or snow cover management will be identified in the activity plans of the Bureau Planning System for the range, wildlife habitat, woodland and watershed resources. Water yield improvements may be accomplished primarily by vegetation manipulation or by snow management. Such practices will also be evaluated by the soil scientist, soil conservationist and water management specialist in terms of improving plant-available soil water supplies.

Watershed restoration, maintenance, and improvement calls for water resources input to planning and management. This requires an interdisciplinary team effort (water management specialist, hydrologist, range conservationist, soil scientist) to perform the following:

- Conduct watershed inventories which include such components as susceptibility to sheet erosion, vegetative cover condition, stream channel condition, bank vegetation and sediment yield.

- Prepare watershed activity plans intended to restore impaired watershed values resulting from misuse or natural disasters such as drought, flood or fire. This includes evaluating values lost and opportunities for enhancement; recommending treatments, such as contour furrowing, deferred use, fertilization, seeding, water spreading, sediment entrapment; and recommending the best treatment in view of resource potential and benefit/cost analysis.

- Provide input to design and maintenance of watershed rehabilitation or development projects or existing projects, detention structures, groundwater development, or water distribution systems.



- Monitor watershed response to management practices to recommend modification of practices if a given watershed is experiencing deterioration of water resource values. To provide input to decisions regarding maintenance of individual structures, improvements or treatments, including stream channel clearing, revegetating, aquatic fauna and flora control, and noxious weed control (in cooperation with the State Department of Agriculture and the counties).

- Conduct or supervise rehabilitation work to stabilize soil and prevent further on site damage caused from abandoned reservoirs, roads, and other facilities.



# VIII. References Cited

- A. Federal Council for Science and Technology. "Scientific Hydrology." June 1962.
- B. Hewlett, J.D., and Nutter, W.L. An Outline of Forest Hydrology. University of Georgia Press. Athens, Georgia. 1969.
- C. Public Law 91-190. The National Environmental Policy Act.
- D. Public Law 92-500. Federal Water Pollution Control Act.
- E. Public Law 93-523. Safe Drinking Water Act.
- F. Public Law 94-579. Federal Land Policy and Management Act of 1976.
- G. Public Law 95-217. Clean Water Act of 1977.



## IX. Appendices

The basic water resources program elements are not expected to change significantly, but the appendices are subject to periodic expansion and revision. They include:

### A. District Water Resources Programs

1. Guidelines for Development of District Water Resources Programs
2. District Programs (reserved)

### B. Current Program Directives (reserved)

### C. Technical Guidelines (reserved)

1. Excerpts from legislation pertaining to water resources management (reserved)
2. Ground Water Investigation Program (reserved)
3. Small Basin Modeling Program (reserved)
4. Bureau Planning System (reserved)
5. Surface Protection (reserved)
  - Roads
  - Mineral Exploration and Development
  - Oil and Gas/Geothermal Exploration and Development
6. Mined Land Reclamation Guidelines (reserved)



## A. Appendix A - District Water Resources Programs

### 1. Guidelines for Development of District Water Resources Programs

The purpose for developing a District program is threefold:

- To ensure water resources data needs and input requirements are considered and planned, with sufficient lead time to promote quality input.
- To provide useful input to Annual Work Plans, Bureau Planning System, and environmental statements.
- To document accomplishments (studies carried out, data recorded) to benefit future projects and programs.

District programs should be specific and updated annually to indicate changes in program accomplishments and priorities. They should contain the following:

- District responsibilities for the program components as delineated in Chapter VII of this document.
- Specific baseline data needs.

Each District program is to be reviewed annually by the State Office to maintain quality control and obtain AWP input concerning water resources.

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(June 1984)

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